

cating stirring, the temperature is raised to 200° C., and the temperature is then held constant for about 10 hours to allow completion of the synthesis. During this period, excess glycols distill from the homogeneous mixture.

The composition of the Example XIV product is expressed by the empirical formula:



wherein (2G) represents unsymmetrical oxy-1,2-alkyleneoxy units, which have structure differing from oxy-1,2-propyleneoxy units only in that the former have ethyl side-chains, in contrast with the methyl side-chains of the latter.

Repetition of the above procedure, using 1,2-propylene carbonate in replacement of the ethyl-substituted cyclic carbonate, leads to formation (Example XV) of an ester composition represented by:



Structures of illustrative ester molecules of the compositions of Examples XIV and XV are, respectively, similar to and identical with structures depicted in Example I.

Use of Esters of the Invention as Soil-Release Agents

Esters of the invention are especially useful as soil-release agents of a type compatible in the laundry with conventional detergent and fabric-conditioner ingredients (such as those found in granular detergents and dryer-added sheets, respectively). The ester compositions, as provided herein, will typically constitute from about 0.1% to about 10% by weight of a granular detergent and from about 1% to about 70% by weight of a dryer-added sheet. See the following patents, all incorporated herein by reference, for detailed illustrations of granular detergent compositions and articles, such as dryer-added sheets, suitable for use in combination with the soil release esters herein; these patents include disclosures of types and levels of typical detergent surfactants and builders, as well as of fabric conditioner active ingredients useful herein: U.S. Pat. Nos. 3,985,669, Krummel et al., issued Oct. 12, 1976; 4,379,080, Murphy, issued Apr. 5, 1983; 4,490,271, Spadini et al., issued Dec. 25, 1984 and 4,605,509, Corkill et al., issued Aug. 12, 1986 (in the foregoing, granular detergent compositions have non-phosphorus builder systems; other non-phosphorus builders usable herein are the compounds tartrate monosuccinate/tartrate disuccinate, disclosed in U.S. Pat. No. 4,663,071, Bush et al., issued May 5, 1987 and 2,2-oxodisuccinate, disclosed in U.S. Pat. No. 3,128,287, Berg, issued Apr. 7, 1964). Phosphorus-containing builders well-known in the art can also be used, as can bleaches; see U.S. Pat. No. 4,412,934, Chung et al., issued Nov. 1, 1983. Articles for use in automatic tumble-dryers are illustrated in more detail in U.S. Pat. Nos. 3,442,692, Gaiser, issued May 6, 1969; 4,103,047, Zaki et al., issued July 25, 1978 and 3,686,025, Morton, issued Aug. 22, 1972.

Ester compositions of the invention, at aqueous concentrations ranging from about 1 to about 50 ppm, more preferably about 5 to about 30 ppm, provide effective, combined cleaning and soil release treatments for polyester fabrics washed in an aqueous, preferably alkaline (pH range about 7 to about 11, more preferably about 9 to about 10.5) environment, in the presence of typical granular detergent ingredients; including anionic sur-

factants, phosphate, ether carboxylate or zeolite builders, and various commonly used ingredients such as bleaches, enzymes and optical brighteners. Surprisingly (especially insofar as pH and anionic surfactant are concerned), all of these detergent ingredients can be present in the wash water at their art-disclosed levels, to perform their conventional tasks, e.g., for cleaning and bleaching fabrics or the like, without ill-effects on the soil release properties of the esters.

Thus the invention encompasses a method of laundering fabrics and concurrently providing a soil release finish thereto. The method simply comprises contacting said fabrics with an aqueous laundry liquor containing the conventional detergent ingredients described hereinabove, as well as the above-disclosed effective levels of a soil release agent (namely, from about 1 to 50 ppm of an oligomeric or polymeric composition comprising at least 10% by weight of an ester of the invention). Although this method is not especially limited in terms of factors such as pH and surfactant types present, it should be appreciated that for best cleaning of fabrics, it is often especially desirable to make use, in the laundry process, of anionic surfactants, such as conventional linear alkylbenzene sulfonates, and also to use higher pH ranges as defined above. Use of these surfactants and pH ranges surprisingly does not prevent the esters of the invention from acting effectively as soil release agents. Thus, a preferred method, for an optimized combination of cleaning and soil-release finishing, provided by the invention, constitutes using all of the following:

the preferred levels of soil release agent (5-30 ppm);
anionic surfactant;

pH of from about 7 to about 11; and, by way of soil release agent, a preferred composition of the invention, such as the oligomeric product of reacting compounds comprising sulfobenzoic acid or a C₁-C₄ alkyl carboxylate ester thereof as the monosodium salt, dimethyl terephthalate and 1,2-propylene glycol (see, for example the methods for making and examples, such as Example I, hereinabove for further details).

In the preferred method, polyester fabrics are used; best soil-release results are achieved thereon, but other fabric types can also be present.

The most highly preferred method for simultaneous cleaning and soil-release treatment is a "multi-cycle" method; although benefits are surprisingly obtainable after as little treatment as a single laundry/use cycle, best results are obtained using two or more cycles comprising the ordered sequence of steps:

(a) contacting said fabrics with said aqueous laundry liquor in a conventional automatic washing machine for periods ranging from about 5 minutes to about 1 hour;

(b) rinsing said fabrics with water;

(c) line- or tumble-drying said fabrics; and

(d) exposing said fabrics to soiling through normal wear or domestic use.

Naturally, it will be appreciated that this "multi-cycle" method encompasses methods starting at any one of steps (a) through (d), provided that the soil release treatment step (a) is used two or more times.

In the above, hand-washing provides an effective but less preferred variant in step (a), wherein U.S. or European washing machines operating under their conventional conditions of time, temperature, fabric load, amounts of water and laundry product concentrations will give the best results. Also, in step (c), the "tumble-